been inserted. The word "*squared*" ought to be removed as ridiculous; those stone foundations which are of materials not squared, but closely united at various angles, in general are the soundest and freest from settlement.

Walls generally.—" With regard to every party fence-wall, and to the external walls and party-walls of every building hereafter built, and of every addition to such building, whether already built or hereafter built,—Every such wall must stand equally on each side within the top of its footing."

Compelling the upward diminution of footings to be equal on both sides is highly objectionable; there are many cases in which walls, to be built substantially and effectively, are required to be set out of perpendicular, and with their footings more on one side than the other.

Thicknesses of Enclosing Walls to Stories of Buildings of whatever Rate.—" With regard to the enclosing walls to stories of buildings of the first and second classes,—Each of the enclosing walls of any such story, throughout the whole height thereof, from the top of the footing up to the top of such story, and with all the sets-off in addition required for such wall, to whatever rate or whichever class it may belong, and throughout at the least one-third of the whole length of such wall, in piers properly distributed, must be of the following dimensions (unless cross or return walls, coursed and bonded with the enclosing walls, shall, in the opinion of the official referees, upon special application to them in each particular case, give sufficient strength, with less thickness in such enclosing walls); that is to say,—

" As to first class buildings; if the story be in height more than 11 feet,—then the thickness of its enclosing walls must be at the least 13 inches.

"Or if the story be in height more than 15 feet,—then the thickness of its enclosing walls must be at the least 17½ inches.

" As to second class buildings; if the story be in height more than 9 feet,—then the thickness of its enclosing walls must be at the least 13 inches.

" Or if the story be in height more than 12 feet,—then the thickness of its enclosing walls must be at the least 17½ inches.

" Or if the story be in height more than 15 feet,—then the thickness of its enclosing walls must be at the least 21½ inches.

" Or if the story be in height more than 18 feet—then the thickness of its enclosing walls must be at the least 26 inches.

" Nevertheless, any external wall of any building of the first class in which there are no apertures or *recesses* may be built of the thickness of 13 inches, of any height not exceeding 18 feet, within any story, although the rate of the wall may require a greater thickness, if another external wall and a cross wall of not less than 8½ inches thick, coursing and bonding with such external wall, or if two such cross walls occur within a length of 24 feet of such wall; but always upon condition that the substructure of such wall is 4 inches thicker at the least than such superstructure, and vertically under it.

" And also any such external wall abutted by cross or return walls within a length of 12 feet may be built of any thickness not less than 13 inches, notwithstanding the rate of such wall may require a greater thickness, if not more than one aperture or recess occur within such length of 12 feet, and not more than one-half the quantity in length be taken out of such compartment of a wall by any such aperture or recess."

PART II.—*External Walls.— Construction and Materials.*—" And with regard to the component materials of external walls to buildings of whatever class:—

" Every such wall must be built of SOUND BRICKS, or of SQUARED STONE, or of SUCH BRICKS AND STONE TOGETHER, laid in and with mortar or cement in such manner as to produce solid work; and every such wall must be carried up of its full thickness to the underside of the plate under the roof.

" Nevertheless, in such walls, besides all requisite openings for doors and windows, recesses may be formed, so that the back thereof be of the thickness of 8½ inches at the least; and so that the stability and sufficiency of the wall be not injuriously affected by making such recesses.

" And with regard to other substances than the component materials of external walls,

" There may be such wood and iron as shall be necessary.

" And every plate, lintel, bond, corbel, being of wood, and every wood-brick laid into any external wall, and all ends of joists, of girders, and of the heads and sills of partitions running into any external wall, must be fixed at a distance from the external face of the wall of four inches at the least.

" And the frames of doors and windows must be fixed in reveals at a distance from the external face of the wall of four inches at the least.

" And shop-fronts must be fixed in such manner as is herein specially directed.

" And the tiers of doors-cases to warehouses must be fixed in the openings left in such walls, at a distance from the external face of the wall of two inches at the least.

" But no timber must be laid into any external wall in such manner, or of such length, as to render the part of the wall above it wholly, or in great part, dependent upon the wood for support, or so that any such wood might not be withdrawn without endangering the safety of the superincumbent structure, except in the case of bressummers."

We again refer to Mr. Bartholomew's notes: absurd is the objection to "*opus incertum*" masonry, such as most ancient Gothic buildings are composed of, and which has in so many thousand instances survived walls of squared materials. We advise an hour's two-shilling ride to Chesham Church, which is of such masonry, sound, and without a fracture.

Wood and Iron.—" We think that no plate or bond of wood ought to be allowed to extend into a wall so much as half the thickness of such wall, and that in walls not exceeding 13 inches in thickness, the wooden plates and bond inserted therein ought to be restricted to 4 inches.

"We think that more exact definitions are required respecting the ranges of windows of printing-offices and workshops."

Height and Thickness of Parapets.—" And with regard to external walls, in reference to the height and thickness of any parapet thereon:—

" If an external wall adjoin a gutter,—then such external wall must be carried up, and remain one foot at the least above the highest part of such gutter.

" And the thickness of an external wall, so carried up above the level of the underside of the gutter-plate, and forming a parapet, must be at the least,—

" In every such wall of the extra first rate of the first class, and in every such wall of the first rate of the second class, 13 inches thick; and—

" In every other external wall of whatever rate or whichever class, 8½ inches thick."

The *requirement* of parapets 13 inches thick is ridiculous, tending to injure the formation of gutters properly, and affording no advantage. Nothing could be more absurd than to compel gothic pierced parapets, carried up for ornament, to be made expensively goaty: those roofs last far the longest which project without any parapets at all, the wet, in case of imperfection, falling *without* the building.

(*To be continued.*)

SOMATOLOGY, OR THE ESSENTIAL AND CONTINGENT PROPERTIES OF MATTER.

BY ALEXANDER JAMIESON, LL.D.

(*Continued from p. 311.*)

Our organs of sense furnish us with accurate ideas or perceptions of the various properties which all bodies possess, whether in a state of apparent rest or of visible motion. Thus, *touch* informs us of the exterior surface of a body, its figure, hardness, softness, or any other property essential or contingent which it may possess, except colour, smell, or taste. Sight, with the intervention of light, gives us clear perceptions of the superficial extension and figure, apparent magnitude, colour, &c. of bodies. Hence we may clearly understand how observation, or that attention which we pay to the appearances of objects that are remarkable, or which become subjects of our scrunity, contributes to our aid in the pursuit of science. And things become remarkable as they fall under our scrutiny and observation and not by tradition; by their reference to other objects, or by their comparison, similitude, or contrast with each other. Our familiarity from infancy with the objects around us, and the heedless gaze we glance upon, the material world, our daily intercourse with the objects of which it is composed, the knowledge we have by habit of its wonderful properties, all contribute to make us indifferent observers; nor do we readily begin to read the volume of nature to mark the various appearances under which she presents herself to our view, to learn that there is one set of phenomena which characterizes the operations of our mind in its examinations and pursuits, and another which characterizes body, matter, or the substances composing this fair world; and that these are *toto cœlo* different one from the other. But when we have begun to speculate upon the material world, we find that our souls are endowed with powers capable of deriving pleasure from an accumulation of intellectual knowledge, independent of all consideration of its advantages. Our observation becomes then profitably fixed upon the properties of body or of matter, and we in some measure understand by reference to other bodies and other matter, what may be the bulk, weight, elasticity, fluidity, &c. of such as we wish to compare and contrast one with another. And if these observations be applied to what we have already said upon this subject—that is upon body or matter—the reader will clearly perceive what species of discipline the mind undergoes in entering upon the very threshold of science, and with how much stability it must be loaded, if we may speak figuratively, in order to exercise its powers for the acquisition of such knowledge as belongs to that branch of natural philosophy which we designate somatology.

All bodies are composed of elements which are supposed to be few in number, but, by their combinations, capable of producing all the varieties found in the works of nature. The extraordinary transformations we discover excite our surprise, and prove that there can be no absolute annihilation. We do not refer to mere antiseptics or those substances that resist putrefaction, or apparent dissolution by the action of the elements; nor do we glance at the wreck of the antediluvian world in coal basins, chalk-pits, and organic remains of animals larger than any now existing by as much as the lives of the patriarchs exceeded the present standard of life in the proportion, at least, of ten to one. The antediluvian world was altogether, and except one family and the animals, &c., preserved by that family, entirely changed by a visitation the most awful that could have visited the earth; but there was no annihilation of the materials composing the old world. Nor is there annihilation now of any part of nature's productions. Thus, grass seems to be the origin of blood, chyle, milk, flesh, bones: and light, air, and water are the chief nourishment of plants that grow in the earth or vegetate in any other circumstances. The oak is the same material now that it was four thousand years ago. Its essence is unchangeable. In fact, we may thence infer that the elements of bodies are not only few in number but unchangeable in character, essence, or essential properties. Men are black, coppee-coloured, brown, fair: cross the breed as you will, the elements of the original remain unchangeable,—nature is always herself. And this regularity, or uniformity in the course of nature, shows that the elementary parts of bodies are permanent and unchangeable; for if these elementary particles which constituted an oak some four thousand years ago had undergone any gradual decay, the oaks of the present day would have been formed considerably different from those of the Patriarch's times; but as we cannot allege any difference, it would seem that the ultimate elements of bodies have continued the same. This is equally remarkable in the human race. Men are not more divided by speech than by cast or colour and physical organization.

We have already noticed that the ancients confined the elements of bodies to four—fire, air, earth, and water: but chemistry unfolds many combinations of air, earth, and water, into each of which that invisible fluid *heat* enters, and with which they unite in a wonderful manner. All matter which is the object of

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